

CLAIMS

What is claimed is:

1. A nonwoven fabric made from a composition comprising:
a first component comprising from 5% to 99% by weight based on the total weight of the composition of a polymer selected from the group consisting of homopolymers of propylene and random copolymers of propylene, the polymer having a heat of fusion as determined by DSC of less than 50 J/g and stereoregular propylene crystallinity; and
a second component comprising from 95% to 1% by weight based on the total weight of the composition of a propylene polymer or blends of propylene polymers;
wherein the nonwoven fabric has a permanent set of from less than 60%.
2. The nonwoven fabric of claim 1, wherein the permanent set is from less than 30%.
3. The nonwoven fabric of claim 1, wherein the permanent set is from less than 15%.
4. The nonwoven fabric of claim 1, wherein the nonwoven fabric has an elongation of from greater than 80%.
5. The nonwoven fabric of claim 1, wherein the nonwoven fabric has an elongation of from greater than 150%.
6. The nonwoven fabric of claim 1, wherein the nonwoven fabric has an elongation of from greater than 300%.
7. The nonwoven fabric of claim 1, wherein the nonwoven fabric demonstrates anisotropic elongation.
8. The nonwoven fabric of claim 1, wherein the first component has isotactic stereoregular propylene crystallinity.

9. The nonwoven fabric of claim 1, wherein the first component is a random copolymer of propylene and at least one comonomer selected from ethylene, C₄-C₁₂ α -olefins, and combinations thereof.
10. The nonwoven fabric of claim 9, wherein the comonomer is ethylene.
11. The nonwoven fabric of claim 1, wherein the first component has a narrow compositional distribution, and a melting point as determined by DSC of from 25°C to 110°C.
12. The nonwoven fabric of claim 1, wherein the first component comprises from 2 wt% to 25 wt% polymerized ethylene units, based on the total weight of the polymer.
13. The nonwoven fabric of claim 1, wherein the first component has a heat of fusion as determined by DSC of from 1 J/g to 50 J/g.
14. The nonwoven fabric of claim 1, wherein the first component has a heat of fusion as determined by DSC of from 3 J/g to 15 J/g.
15. The nonwoven fabric of claim 1, wherein the first component has a melting point as determined by DSC of from 35°C to 70°C.
16. The nonwoven fabric of claim 1, wherein the first component has a molecular weight distribution Mw/Mn of from 2.0 to 4.5.
17. The nonwoven fabric of claim 1, wherein the first component has an MFR of from 5 to 5000.
18. The nonwoven fabric of claim 1, wherein the second component comprises a propylene polymer produced using a metallocene catalyst system or a Ziegler-Natta catalyst system.
19. The nonwoven fabric of claim 1, wherein the second component has a Mw/Mn of from 1.5 to 8.0

20. The nonwoven fabric of claim 1, wherein the second component has a melting point of from greater than 110°C.
21. The nonwoven fabric of claim 1, wherein the first component is present in the composition in an amount of from 50 to 99 wt% and the second component is present in an amount of from 50 to 1 wt%, based on the total weight of the composition.
22. The nonwoven fabric of claim 1, wherein the first component is present in the composition in an amount of from 80 to 99 wt% and the second component is present in an amount of from 20 to 1 wt%, based on the total weight of the composition.
23. The nonwoven fabric of claim 1, wherein the first component is present in the composition in an amount of from 90 to 99 wt% and the second component is present in an amount of from 10 to 1 wt%, based on the total weight of the composition.
24. A laminate comprising a nonwoven fabric comprising a layer made from a composition comprising:
a first component comprising a polymer selected from the group consisting of homopolymers of propylene and random copolymers of propylene, wherein the polymer has a heat of fusion as determined by DSC of less than 50 J/g and stereoregular propylene crystallinity; and
a second component comprising a propylene polymer;
wherein the laminate has a permanent set of from less than 60%.
25. The laminate of claim 24, wherein the permanent set is from less than 30%.
26. The laminate of claim 24, wherein the permanent set is from less than 15%.
27. The laminate of claim 24, wherein the laminate has an elongation of from greater than 80%.

28. The laminate of claim 24, wherein the laminate has an elongation of from greater than 150%.
29. The laminate of claim 24, wherein the laminate has an elongation of from greater than 300%.
30. The laminate of claim 24, wherein the laminate demonstrates anisotropic elongation.
31. The laminate of claim 24, wherein the first component has isotactic stereoregular propylene crystallinity.
32. The laminate of claim 24, wherein the first component is a random copolymer of propylene and at least one comonomer selected from ethylene, C₄-C₁₂ α -olefins, and combinations thereof.
33. The laminate of claim 32, wherein the comonomer is ethylene.
34. The laminate of claim 24, wherein the first component has a narrow compositional distribution, and a melting point as determined by DSC of from 25°C to 110°C.
35. The laminate of claim 24, wherein the first component comprises from 2 wt% to 25 wt% polymerized ethylene units, based on the total weight of the polymer.
36. The laminate of claim 24, wherein the first component has a heat of fusion as determined by DSC of from 1 J/g to 50 J/g.
37. The laminate of claim 24, wherein the first component has a heat of fusion as determined by DSC of from 3 J/g to 15 J/g.
38. The laminate of claim 24, wherein the first component has a melting point as determined by DSC of from 35°C to 70°C.
39. The laminate of claim 24, wherein the first component has a molecular weight distribution Mw/Mn of from 2.0 to 4.5.

40. The laminate of claim 24, wherein the first component has an MFR of from 5 to 5000.
41. The laminate of claim 24, wherein the second component comprises a propylene polymer produced using a metallocene catalyst system or a Ziegler-Natta catalyst system.
42. The laminate of claim 24, wherein the second component has a Mw/Mn of from 1.5 to 8.0
43. The laminate of claim 24, wherein the second component has a melting point of from greater than 110°C.
44. The laminate of claim 24, wherein the first component is present in the composition in an amount of from 50 to 99 wt% and the second component is present in an amount of from 50 to 1 wt%, based on the total weight of the composition.
45. The laminate of claim 24, wherein the first component is present in the composition in an amount of from 80 to 99 wt% and the second component is present in an amount of from 20 to 1 wt%, based on the total weight of the composition.
46. The laminate of claim 24, wherein the first component is present in the composition in an amount of from 90 to 99 wt% and the second component is present in an amount of from 10 to 1 wt%, based on the total weight of the composition.
47. The laminate of claim 24, wherein the laminate comprises a layered structure comprising, in various combinations, spunbond layers and meltblown layers.
48. An article or an article component comprising a nonwoven fabric made from a composition comprising:
a first component comprising a polymer selected from the group consisting of homopolymers of propylene and random copolymers of propylene,

wherein the polymer has a heat of fusion as determined by DSC of from 1 J/g to 50 J/g and stereoregular propylene crystallinity; and
a second component comprising a propylene polymer;
wherein the nonwoven fabric has a permanent set of from less than 60%.

49. The article or the article component of claim 48, wherein the permanent set is from less than 30%.
50. The article or the article component of claim 48, wherein the permanent set is from less than 15%.
51. The article or the article component of claim 48, wherein the nonwoven fabric has an elongation of from greater than 80%.
52. The article or the article component of claim 48, wherein the nonwoven fabric has an elongation of from greater than 150%.
53. The article or the article component of claim 48, wherein the nonwoven fabric has an elongation of from greater than 300%.
54. The article or the article component of claim 48, wherein the nonwoven fabric demonstrates anisotropic elongation.
55. The article or the article component of claim 48, wherein the first component has isotactic stereoregular propylene crystallinity.
56. The article or the article component of claim 48, wherein the first component is a random copolymer of propylene and at least one comonomer selected from ethylene, C₄-C₁₂ α -olefins, and combinations thereof.
57. The article or the article component of claim 56, wherein the comonomer is ethylene.
58. The article or the article component of claim 48, wherein the first component has a narrow compositional distribution, and a melting point as determined by DSC of from 25°C to 110°C.

59. The article or the article component of claim 48, wherein the first component comprises from 2 wt% to 25 wt% polymerized ethylene units, based on the total weight of the polymer.
60. The article or the article component of claim 48, wherein the first component has a heat of fusion as determined by DSC of from 1 J/g to 50 J/g.
61. The article or the article component of claim 48, wherein the first component has a heat of fusion as determined by DSC of from 3 J/g to 15 J/g.
62. The article or the article component of claim 48, wherein the first component has a melting point as determined by DSC of from 35°C to 70°C.
63. The article or the article component of claim 48, wherein the first component has a molecular weight distribution Mw/Mn of from 2.0 to 4.5.
64. The article or the article component of claim 48, wherein the first component has an MFR of from 5 to 5000.
65. The article or the article component of claim 48, wherein the second component comprises a propylene polymer produced using a metallocene catalyst system or a Ziegler-Natta catalyst system.
66. The article or the article component of claim 48, wherein the second component has a Mw/Mn of from 1.5 to 8.0
67. The article or the article component of claim 48, wherein the second component has a melting point of from greater than 110°C.
68. The article or the article component of claim 48, wherein the first component is present in the composition in an amount of from 50 to 99 wt% and the second component is present in an amount of from 50 to 1 wt%, based on the total weight of the composition.

69. The article or the article component of claim 48, wherein the first component is present in the composition in an amount of from 80 to 99 wt% and the second component is present in an amount of from 20 to 1 wt%, based on the total weight of the composition.
70. The article or the article component of claim 48, wherein the first component is present in the composition in an amount of from 90 to 99 wt% and the second component is present in an amount of from 10 to 1 wt%, based on the total weight of the composition.
71. The article or article component of claim 48, wherein the article or the article component is selected from the group consisting of at least one of a hygiene product, a medical product, and a consumer product.
72. A process to produce a nonwoven fabric, the process comprising the steps of:
blending a first component comprising from 5% to 99% by weight based on the total weight of the composition of a polymer selected from the group consisting of homopolymers of propylene and random copolymers of propylene, the polymer having a heat of fusion as determined by DSC of less than 50 J/g and stereoregular propylene crystallinity; and
a second component comprising from 95% to 1% by weight based on the total weight of the composition of a propylene polymer or blends of propylene polymers; to form a blend;
extruding the blend to form a plurality of fibers to form a web; and
calendering the web to form the nonwoven fabric, the nonwoven fabric having a permanent set of from less than 60%.
73. The process of claim 72, wherein the permanent set is from less than 30%.
74. The process of claim 72, wherein the permanent set is from less than 15%.
75. The process of claim 72, wherein the nonwoven fabric has an elongation of from greater than 80%.

76. The process of claim 72, wherein the nonwoven fabric has an elongation of from greater than 150%.
77. The process of claim 72, wherein the nonwoven fabric has an elongation of from greater than 300%.
78. The process of claim 72, wherein the nonwoven fabric demonstrates anisotropic elongation.
79. The process of claim 72, wherein the first component is present in the blend in an amount of from 50 to 99 wt% and the second component is present in an amount of from 50 to 1 wt%, based on the total weight of the blend.
80. The process of claim 72, wherein the first component is present in the blend in an amount of from 80 to 99 wt% and the second component is present in an amount of from 20 to 1 wt%, based on the total weight of the blend.
81. The process of claim 72, wherein the first component is present in the blend in an amount of from 90 to 99 wt% and the second component is present in an amount of from 10 to 1 wt%, based on the total weight of the blend.
82. The process of claim 72, wherein the calendering further comprises annealing.
83. The process of claim 82, wherein the calendering comprises annealing the nonwoven fabric in a single step.
84. The process of claim 83, wherein the annealing is performed at temperature of at least 40°C.
85. The process of claim 83, wherein the annealing is performed at temperature of at least 90°C.

86. The process of claim 83, wherein the annealing is performed at temperature of at least 100°C.
87. The process of claim 83, wherein the annealing is performed at temperature of at least 130°C.
88. The process of claim 83, wherein the annealing is performed at temperature of at least 160°C.
89. A laminate produced by the process of thermobonding a plurality of layers comprising nonwoven fabrics comprising at least one layer of a melt blown fabric, a spunbond fabric, or a combination of a melt blown fabric and a spunbond fabric, the at least one layer made from a composition comprising:
a first component comprising a polymer selected from the group consisting of homopolymers of propylene and random copolymers of propylene, wherein the polymer has a heat of fusion as determined by DSC of less than 50 J/g and stereoregular propylene crystallinity; and
a second component comprising a propylene polymer;
wherein the at least one layer has a permanent set of from less than 60%.
90. The laminate of claim 89, wherein the permanent set is from less than 30%.
91. The laminate of claim 89, wherein the permanent set is from less than 15%.
92. The laminate of claim 89, wherein the at least one layer has an elongation of from greater than 80%.
93. The laminate of claim 89, wherein the at least one layer has an elongation of from greater than 150%.
94. The laminate of claim 89, wherein the at least one layer has an elongation of from greater than 300%.

95. The laminate of claim 89, wherein the at least one layer demonstrates anisotropic elongation.
96. The laminate of claim 89, wherein the first component is present in the composition in an amount of from 50 to 99 wt% and the second component is present in an amount of from 50 to 1 wt%, based on the total weight of the composition.
97. The laminate of claim 89, wherein the first component is present in the composition in an amount of from 80 to 99 wt% and the second component is present in an amount of from 20 to 1 wt%, based on the total weight of the composition.
98. The laminate of claim 89, wherein the first component is present in the composition in an amount of from 90 to 99 wt% and the second component is present in an amount of from 10 to 1 wt%, based on the total weight of the composition.
99. A nonwoven fabric made from a composition comprising:
a first component comprising from 5% to 100% by weight based on the total weight of the composition of a polymer selected from the group consisting of homopolymers of propylene and random copolymers of propylene, the polymer having a heat of fusion as determined by DSC of less than 50 J/g and stereoregular propylene crystallinity; and
a second component comprising from 95% to 0% by weight based on the total weight of the composition of a propylene polymer or blends of propylene polymers;
wherein the nonwoven fabric has a permanent set of from less than 60%.
100. The nonwoven fabric of claim 99, wherein the permanent set is from less than 30%.
101. The nonwoven fabric of claim 99, wherein the permanent set is from less than 15%.
102. The nonwoven fabric of claim 99, wherein the nonwoven fabric has an elongation of from greater than 80%.

103. The nonwoven fabric of claim 99, wherein the nonwoven fabric has an elongation of from greater than 150%.
104. The nonwoven fabric of claim 99, wherein the nonwoven fabric has an elongation of from greater than 300%.
105. The nonwoven fabric of claim 99, wherein the nonwoven fabric demonstrates anisotropic elongation.
106. A nonwoven fabric made from an isotactic propylene polymer composition, the isotactic propylene polymer composition having a heat of fusion as determined by DSC of from 5 J/g to 45 J/g; wherein the nonwoven fabric has a permanent set of from less than 60%.
107. The nonwoven fabric of claim 106, wherein the permanent set is from less than 30%.
108. The nonwoven fabric of claim 106, wherein the permanent set is from less than 15%.
109. The nonwoven fabric of claim 106, wherein the nonwoven fabric has an elongation of from greater than 80%.
110. The nonwoven fabric of claim 106, wherein the nonwoven fabric has an elongation of from greater than 150%.
111. The nonwoven fabric of claim 106, wherein the nonwoven fabric has an elongation of from greater than 300%.
112. The nonwoven fabric of claim 106, wherein the nonwoven fabric demonstrates anisotropic elongation.